▶ FRANÇOISE POINT, *Definable sets in topological differential fields.*

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Let $\mathcal{K}$ be a topological $\mathcal{L}$-field as defined in [3] and its expansion $\langle K, D\rangle$, where D is a derivation on K, with a priori no interactions with the topology of K. Assume $\mathcal{K}$ is a model of a universal $\mathcal{L}$-theory T which has a model completion T_c. Under certain hypothesis on T_c, with N. Guzy, we showed that the expansion of T to the $\mathcal{L} \cup \{D\}$-theory T_D consisting of T together with the axioms expressing that D is a derivation, admits a model-completion $T^*_{c,D}$ which we axiomatized ([3]). Namely, to the theory $T_D \cup T_c$, we added a scheme of axioms (DL), which expressess that each differential polynomial has a zero close to a zero of its associated algebraic polynomial. This scheme (DL) generalizes the axiomatization (CODF) of the theory of closed ordered differential fields ([7]) and is related to the axiom scheme (UC) introduced by M. Tressl in the framework of large fields ([8]).

In this talk, I will review the above setting and basic properties of $T^*_{c,D}$. For instance, whenever T_c has NIP, the non-independence property, then $T^*_{c,D}$ has NIP ([3]). With N. Guzy ([4]), using results of L. van den Dries ([2]), we showed the existence of a fibered dimension function for definable subsets in models of $T^*_{c,D}$.

Then, I will indicate, how to use former results of L. Mathews ([6]) in order to get further information on definable subsets in models of $T^*_{c,D}$. This applies in particular for $T_c = RCF$, or $T_c = pCF$. In the case of $T_c = RCF$, $CODF$ has o-minimal open core (using [1]) and elimination of imaginaries ([5]).

[1] A. Dolich, C. Miller, C. Steinhorn, *Structures having o-minimal open core*, ***Transactions of American Mathematical Society***, vol. 362 (2010), no. 3, pp. 1371–1411.

[2] L. van den Dries, *Dimension of definable sets, algebraic boundedness and henselian fields*, ***Annals of Pure and Applied Logic***, vol. 45 (1989), no. 2, pp. 189-209.

[3] N. Guzy, F. Point, *Topological differential fields*, ***Annals of Pure and Applied Logic***, vol. 161 (2010), no. 4, pp. 570–598.

[4] ———, *Topological differential fields and dimension functions*, to appear in ***Journal of Symbolic Logic.***

[5] F. Point, *Ensembles définissables dans les corps ordonnés différentiellement clos*, ***Comptes Rendus Mathématique. Académie des Sciences. Paris, Series I***, vol. 349 (2011), pp. 929-933.

[6] L. Mathews, *Cell decomposition and dimension functions in first-order topological structures*, ***Proceedings of London Mathematical Society (3)***, vol. 70 (1995), no. 1, pp.1–32.

[7] M. Singer, *The model theory of ordered differential fields*, ***Journal of Symbolic Logic***, vol. 43 (1978), no. 1, pp. 82–91.

[8] M.Tressl, *A uniform companion for large differential fields of characteristic* 0, ***Transactions of American Mathematical Society***, vol. 357 (2005), no. 10, pp. 3933–3951.